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In re Application of:
Manfred Boldy

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For: **Actuating Device for
Miniature Keyboards**

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Attorney Docket No. **DE919990090US1**

Examiner: **Abbas L. Abdulsalam**

Art Unit: **2674**

**TRANSMITTAL OF ENGLISH TRANSLATION
OF PRIORITY DOCUMENT**

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Commissioner for Patents
Washington, D.C. 20231

Technology Center 2600

In order to perfect the priority claim, attached is an English translation of German
Application Number 19957631.9 filed on 30 November 1999.

**CERTIFICATE OF MAILING
37 CFR 1.8(a)**

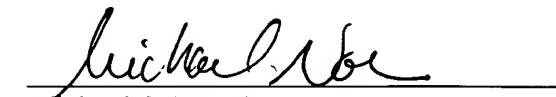
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Respectfully submitted,

A handwritten signature in cursive script, appearing to read "Michael E. Noe, Jr.", is written over a horizontal line.

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DESCRIPTION

ACTUATING DEVICE FOR MINIATURE KEYBOARDS

Field of the invention

The invention concerns an actuating device for miniature keyboards or input tablets with an actuating element which is shaped in the form of a pen and has a tip adapted to the size of the keys or tablet fields, in particular for use with palmtop computers.

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Miniaturized electronic devices such as palmtop computers, input tablets, watches, medical equipment and suchlike have miniature keys or input panels which, as a result of the mismatch in size between the touch area and the width of the finger, are in some cases difficult to operate. In order to enable safe actuation of miniature keyboards, specially adapted pens are used. The actuation of keys with pens of this kind is, however, awkward and time-consuming.

A miniaturized interface device wearable on the finger to generate a digital input into information processing devices is also known (US Patent 4,954,817). The device has a finger palette and a stylus ring which are worn on various fingers and which in their interaction perform the function of a digital input tablet and a conventional mouse input device. For this, the finger palette is worn on the index finger and the stylus ring on the thumb of the same hand. When the two

fingers are brought together the stylus ring can be used to select a specific coordinate on the finger palette and generate a corresponding input into a connected computer, while the fingertips remain free for simultaneous operation of a keyboard. The operation of miniaturized keyboards plays no role in this known device.

Summary of the invention

An object of the invention is to provide a simple and user-friendly actuating device for miniature keyboards or miniature input tablets.

A further object of the invention is to provide an actuating device for miniature keyboards or miniature input tablets which is worn on the finger, which is light in weight, and which does not place a strain on the fingers and hand and does not impede the movement of the fingers.

A further object of the invention is to provide an actuating device for miniature keyboards or miniature input tablets which is worn on the finger and which permits quick and uncomplicated fitting on and removal from the finger.

In accordance with the invention as defined in the Claims, a dome-shaped body is adapted to the curve of the fingertip and fitted to the fingertip by means of a removable adhesive bond. The dome-shaped body has a pin-shaped projection on its convex side which serves as the actuating element. The dome-shaped body is made of a soft plastic material which molds to the fingertip. On the concave side of the dome is an adhesive

layer which permits repeated fitting and removal of the dome to and from the fingertip.

The device in accordance with the invention is suitable for actuation of miniaturized keyboards and for data input on miniaturized input tablets. It also permits combined use to operate a normal keyboard and a miniaturized input tablet or, conversely, a miniaturized keyboard and a normal-sized input tablet. This is possible because the dome barely impedes the movement of the fingers, and keys or input tablets of normal size can be operated even with the dome fitted.

Description of the drawings

Various embodiments of the invention are described in the following on the basis of drawings:

Figure 1 shows a schematic view of a human finger fitted with the actuating device in accordance with the invention.

Figure 2 shows a perspective of a first embodiment of the device in accordance with the invention.

Figure 3 shows a section through the device as shown in Figure 2.

Figure 4 shows a section through a further embodiment of the device in accordance with the invention.

Figure 5 shows a perspective of the device as shown in Figure 4.

Figure 6 shows a section through a third embodiment of the device in accordance with the invention.

Figure 7 shows a perspective of the device as shown in Figure 6.

**Detailed description of the embodiments of the invention
presented in the drawings**

Figure 1 shows a schematic view of a human finger with an actuating device 10 fitted to the fingertip. The embodiment of the actuating device 10 in accordance with the invention presented in Figures 2 and 3 comprises a dome 12, a pin 14 and the convex outer side 15 of the dome 12 and a thin layer 18 applied to the concave inside 16 of the dome 12, said thin layer having an adhesive coating. The dome 12 is preferentially circular around its circumference and is made of a soft plastic material such as polyethylene or PVC, which adapts itself to the shape of the fingertip. The pin 14 is rotationally symmetric and is manufactured as a separate part. It is made of a harder plastic, which may likewise be polyethylene or PVC. The pin 14 is widened at its base and is inserted into an opening in the dome 12 and permanently joined to it, wherein its base surface 17 is adapted to the concave surface 16 of the dome 12 and forms one surface with it. In this position the pin 14 is permanently joined to the dome 12 and the layer 18.

The dome 12 is made of a fine-pored synthetic foam, such as Styrofoam from Dow Chemical, or any standard commercially available mousse foam. The layer 18 is an adhesive bonded layer. A standard commercially available adhesive which permits repeated removal and refitting in the manner of a sticking plaster is suitable as the bonding agent. The layer 18 also has a large number of small perforations 19 which serve to absorb deposits of perspiration on the fingertip.

For use, the dome 12 is fitted on the finger and pressed on, and adheres to the fingertip by means of the adhesive layer. For one-handed operation of miniature electronic devices such as palmtop computers or mobile phones, the dome 12 is preferentially fitted on the thumb, since the thumb is able to cover a wide range of movement and permits positioning of the pin 14 on the keys of the device. The free end of the pin 14 is adapted to the shape of the keys being pressed, and may be pointed or rounded or have a small flattening on its tip. On every press of a key the dome 12 is pressed back onto the tip of the thumb, so that a safe fitting of the dome on the finger is ensured. The dome 12 may instead also be fitted on the tip of the index finger in order to enable two-handed operation or to operate miniaturized input tablets. A number of domes 12 can also be fitted simultaneously on several fingers. Since the domes are small in area, mutual impeding of the fingers as a result of the fitted domes is largely avoided.

Figures 4 - 7 show further embodiments of the invention. In the embodiment of the invention as presented in Figures 4 and 5, a dome 20 and a pin 22 are formed as one combined part made

of a plastic material such as polyethylene or PVC. The hardness of this material is chosen such that it molds to the shape of the fingertip but is still hard enough for the pin 22 to perform its function as an actuating element. The dome 20 is preferentially manufactured as a rotationally symmetric molding and on its inside facing the finger forms a bell-shaped cavity 24. The pin 22 has at its base a funnel-shaped extension 25 which ends at the rim 21 of the dome and forms a further cavity 26. In the area of the rim 21 of the dome a ring-shaped layer 28 is affixed, corresponding to the layer 18 in Figures 2 and 3. The layer comprises a fine-pored synthetic foam and bears an adhesive coating which permits repeated removal and rebonding.

When the dome 20 is fitted on the fingertip a vacuum is created in the cavities 24 and 26 which generates a suction effect in the two cavities 24 and 26. This supports the adhesive power of the adhesive layer 28 and additionally stabilizes the pin 22 when the device is in use, thereby assisting the safe fitting of the dome 20 on the finger. The embodiment of the invention as shown in Figures 4 and 5 is characterized in particular by its light weight.

In the embodiment of the invention as shown in Figures 6 and 7, a dome 30 and a pin 32 are formed as a single part made of a plastic material, such as polyethylene or PVC, as in the embodiment of the invention shown in Figures 4 and 5. The dome 30 is manufactured as a rotationally symmetric molding, shaped like a bell with a relatively thin wall 34. In the central part of the dome 30 the wall 34 merges into the pin 32. In the area of the rim 31 of the dome a ring-shaped layer 36 is

affixed, corresponding to the layer 28 in Figures 4 and 5. The layer is formed as an adhesive bonding layer and permits repeated removal and rebonding. On the concave side of the dome 30 is a lenticular felt inlay 38 which fills out the interior of the bell and stabilizes the dome 30 and the position of the pin 32.

When the dome 30 is fitted on the fingertip the adhesive layer 28 bonds to the finger. By pressing the dome 30 onto the finger the felt inlay 38 is compressed to a certain extent, thereby creating a vacuum in the area surrounding the felt inlay 38 which generates a suction force which in turn assists the adhesive power.

The invention has been described on the basis of embodiments of the invention. Derivations of the embodiments shown and described, or other embodiments of the invention, lie within the framework of the following Claims.

CLAIMS

1. Actuating device for miniature keyboards or input tablets with an actuating element which is shaped in the form of a pen and has a tip adapted to the size of the keys or tablet fields, in particular for use with palmtop computers, characterized by a dome (12) adapted to the curve of the fingertip which can be fitted to the fingertip by means of a removable adhesive bond and which has a pin-shaped projection (14) on its convex side which serves as the actuating element.
2. Device in accordance with Claim 1, characterized in that the dome (12) is made of a soft plastic material which molds to the fingertip.
3. Device in accordance with Claim 1, characterized in that the dome (12) on its concave side is joined to an adhesive layer (18) which permits repeated fitting and removal of the dome to and from the fingertip.
4. Device in accordance with Claim 3, characterized in that the adhesive layer (18) also has a large number of small perforations (19) which serve to absorb deposits of perspiration on the fingertip.
5. Device in accordance with Claim 1, characterized in that the dome (20) is joined on its concave side to a ring-shaped layer (28) which bears an adhesive material, and that the dome forms a cavity (24) within the ring-shaped

layer which acts as a suction cup when the dome is fitted on the fingertip.

6. Device in accordance with Claim 5, characterized in that the circumference of the dome is circular in shape.
7. Device in accordance with Claim 5, characterized in that the pin-shaped projection (22) has a funnel-shaped extension (25) which protrudes into the cavity (24) as far as the rim (21) of the dome and in turn forms a further cavity (26) which acts as a further suction cup when the dome is fitted on the fingertip.
8. Device in accordance with Claim 5, characterized in that the dome (20, 30) and the pin-shaped projection (22, 32) are manufactured as one piece.
9. Device in accordance with Claim 1, characterized in that, in order to form the pin-shaped projection (14), a pin is inserted into an opening in the dome (12) and joined to the dome (12) and to the adhesive layer (18).
10. Device in accordance with Claim 1, characterized in that the dome (30) is joined on its concave side to a ring-shaped layer (36) which bears an adhesive material, and that the dome forms a bell-shaped chamber within the ring-shaped layer which is filled out by an inlay (38) made of a felt-type material.

11. Device in accordance with Claim 10, characterized in that the dome (30) has a thin wall (34) which in its central area merges into the pin-shaped projection (32).

A B S T R A C T

The invention concerns a simple and user-friendly actuating device (10) for miniature keyboards or miniature input tablets. The device consists of a dome-shaped body (12) which is adapted to the curve of the fingertip and fitted to the fingertip by means of a removable adhesive bond. The dome-shaped body has a pin-shaped projection (14) on its convex side which serves as the actuating element. The dome-shaped body is made of a soft plastic material which molds to the fingertip. On the concave side of the dome is an adhesive layer (18) which permits repeated fitting and removal of the dome to and from the fingertip.